CLAIMS LISTING

1. (Currently amended) An integrated optical device comprising a semiconductor substrate in which is formed:

an optically active region for generating and confining optical radiation and having an output end for emitting an output beam from the optically active region;

a lens region positioned to receive the output beam from the output end, the lens region having a reduced refractive index and/~~or~~ an increased bandgap to adjacent substrate material and being shaped to provide a lens effect on said output beam, the lens region comprising a quantum well intermixed region.

2. (Previously presented) The device of claim 1 in which the optically active region forms a cavity having a longitudinal axis, the lens region extending along the longitudinal axis and having a lateral extent that varies as a function of distance along said longitudinal axis.

3. (Original) The device of claim 2 in which the depth of the lens region varies as a function of distance along the longitudinal axis, the depth being defined as the axis orthogonal to both the longitudinal axis and the surface of the substrate.

4. (Original) The device of claim 2 in which the width of the lens region varies as a function of distance along the longitudinal axis, the width being defined as the axis orthogonal to the longitudinal axis and parallel to the surface of the substrate.

5. (Previously presented) The device of claim 4 in which both the depth and width of the

lens region varies as a function of distance along the longitudinal axis, depth being defined as the axis orthogonal to both the longitudinal axis and the surface of the substrate.

6. (Original) The device of claim 1 in which the lens region is an optically passive region.

7. (Original) The device of claim 1 in which the lens region includes an optically active structure.

8. (Original) The device of claim 1 in which the optically active region and the lens region are immediately adjacent one another.

9. (Original) The device of claim 1 further including an intermediate waveguiding structure between the output end of the optically active region and the lens region.

10. (Currently amended) The device of claim 3 in which the ~~lens region comprises a quantum well intermixed region, the~~ degree of quantum well intermixing in the lens region varies ~~varying~~ as a function of distance along the longitudinal axis.

11. (Original) The device of claim 10 further including a layer of material of varying depth over the lens region, the material enhancing quantum well intermixing in the substrate material in which the lens is formed.

12. (Original) The device of claim 1 further including a superlattice structure having a periodic variation in refractive index along an axis orthogonal to the surface of the device, the superlattice extending through the optically active region and the optically passive region.

13. (Original) The device of claim 12 in which the superlattice structure further includes band overlap between layers within the superlattice to create a mini-band for transport of carriers.

14. (Original) The device of claim 12 in which the superlattice structure further provides a variation in periodic band gap maxima as a function of distance along an axis orthogonal to the surface of the device.

15. (Original) The device of claim 1 in which the optical device is a laser.

16. (Original) The device of claim 15 in which the optical device is an edge emitting laser.

17. (Original) The device of claim 1 in which the device is a vertical cavity emitter having a cavity whose longitudinal axis extends substantially orthogonally to the surface of the device.

18. (Original) The device of claim 17 in which the lens region is formed in a surface layer of the device.

19 - 30. (Canceled)